

---

---

# Final Presentation

2016-4-12

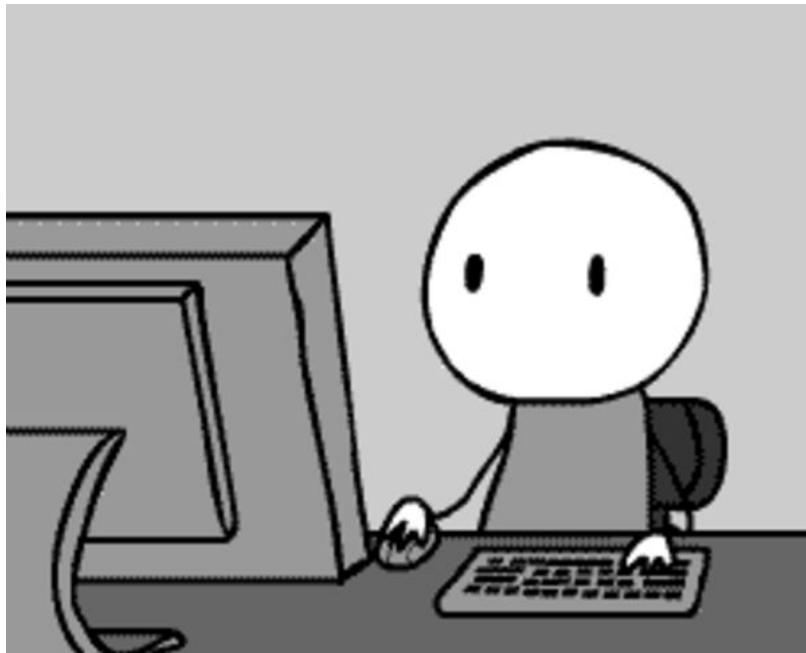
**Team: cd004**



Yuhao (Henry) Zhou  
Chenyu (Charlie) Wang  
Siming Sun

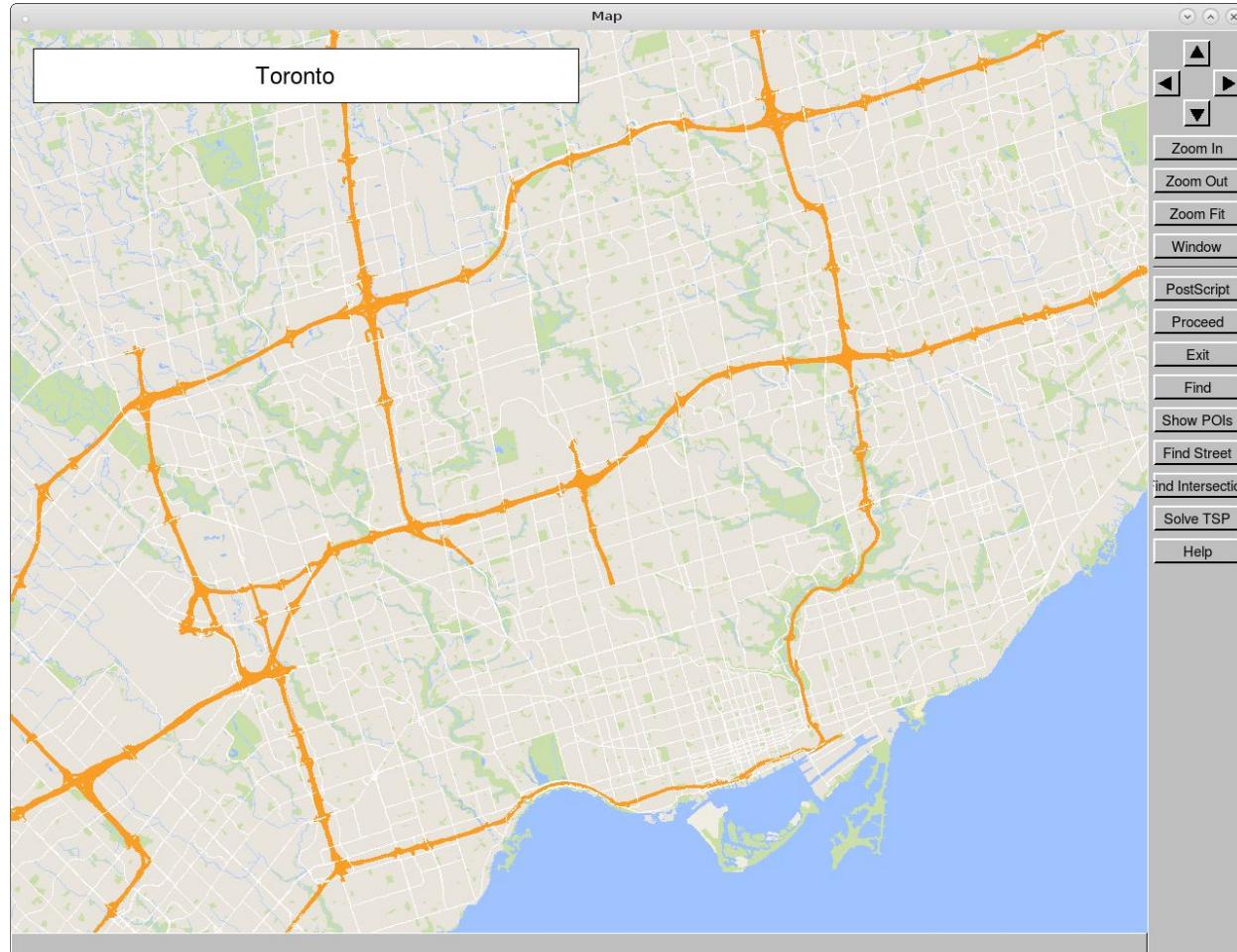
---

---



[1]

[1] <http://i1.kym-cdn.com/photos/images/facebook/000/289/958/515.gif>



# Presentation Outline

- Map Basics
  - Map Overview
  - Feature Demonstration
- Key Innovations
  - Graphical User Interface Optimization
  - Algorithm
- Future

# Map Basics

## System Requirements

- X11
- GNU Standard Library
- C++ Boost Library
- Geographic Information Data File



[1]



[2]



[3]



[4]

[1] <https://upload.wikimedia.org/wikipedia/commons/a/ab/X11.png>

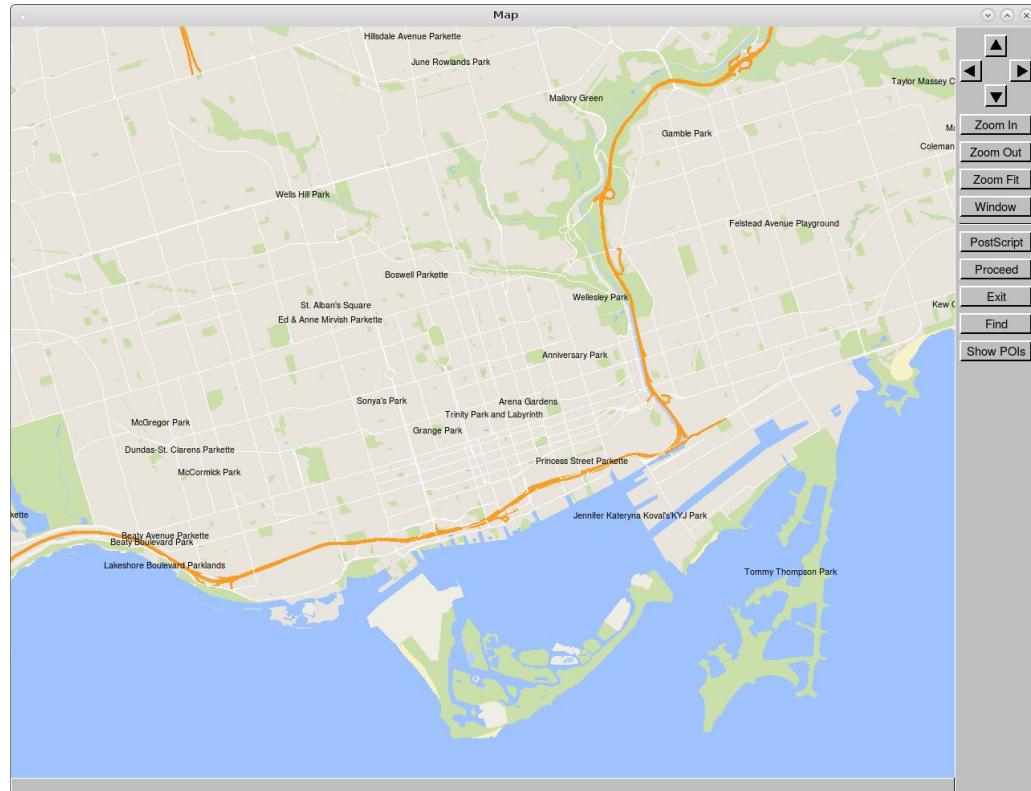
[2] <https://www.gnu.org/graphics/gnu-head.jpg>

[3] [http://www.boost.org/doc/libs/1\\_60\\_0/boost.png](http://www.boost.org/doc/libs/1_60_0/boost.png)

[4][http://www.oginfo.com/images/gis\\_data\\_conversion\\_shape\\_file-610.png](http://www.oginfo.com/images/gis_data_conversion_shape_file-610.png)

# Basic Feature

Drawing Streets, Points of Interests, Natural Features etc.

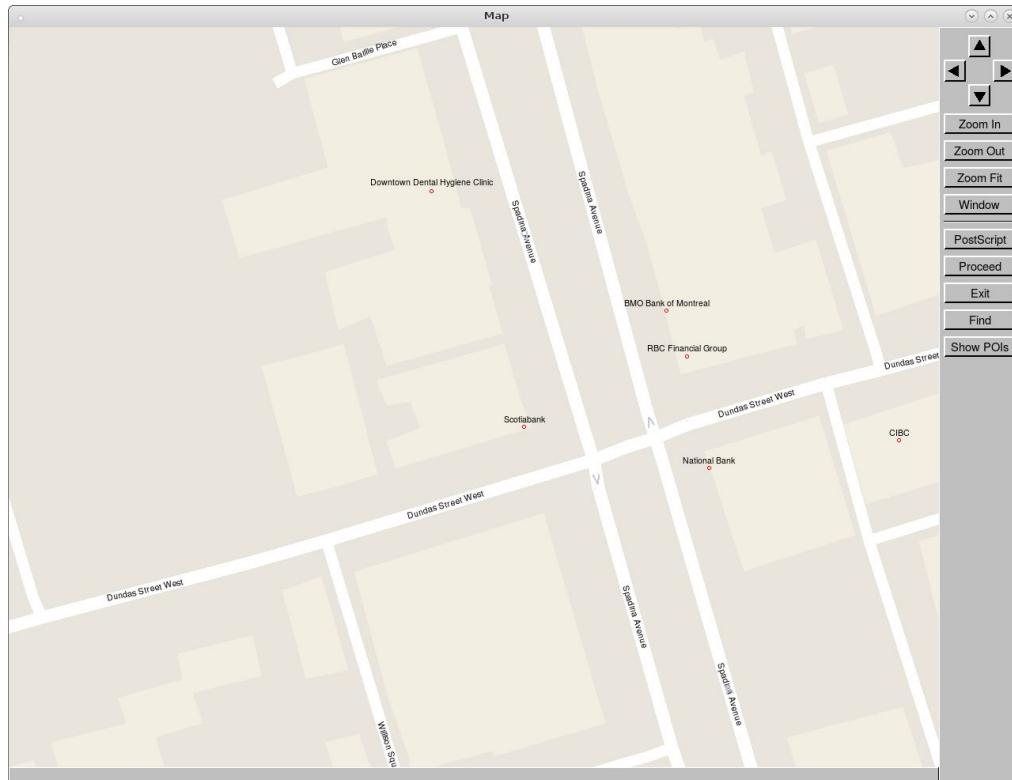


# Basic Feature

Points of Interests

One-way Direction

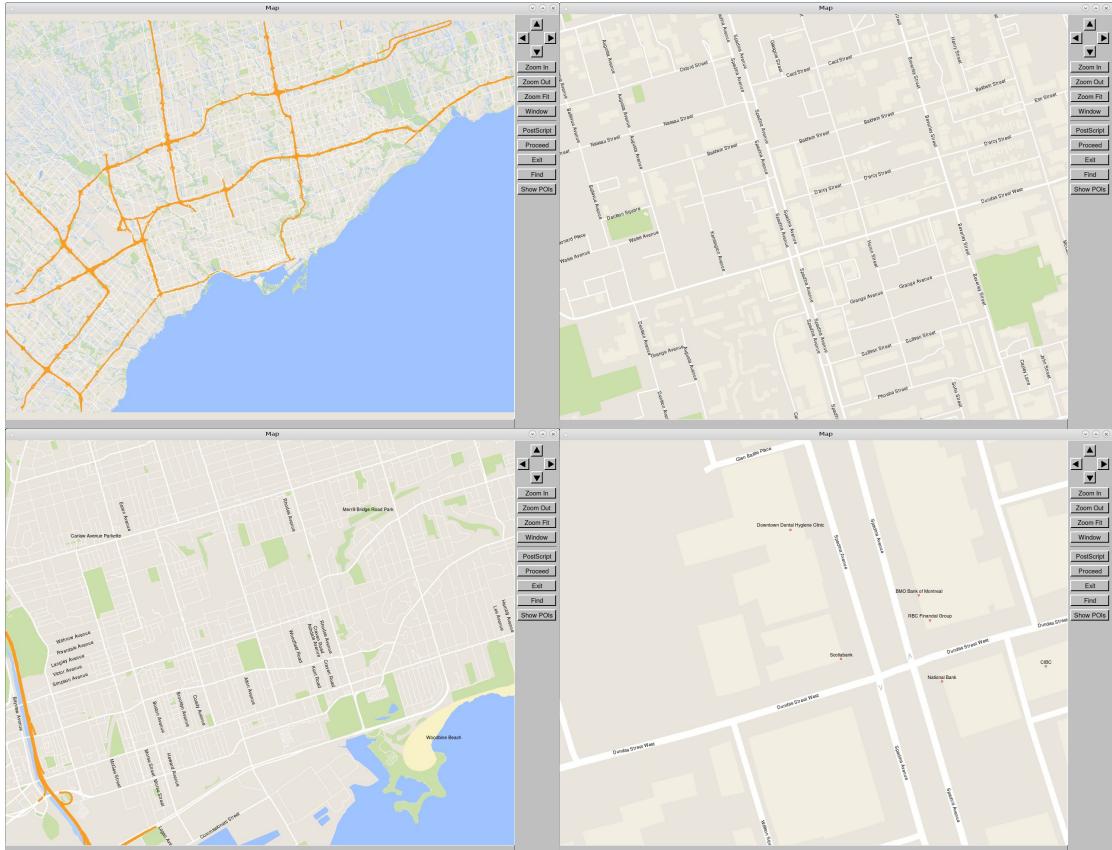
Building



# Basic Feature

Navigate with ease

Different level of details for different zoom levels



# For Better User Experience

## Partial name Search

Map is running...

You can search for an intersection using partial name search by putting " in the beginning

If the partial name search doesn't give you anything, try swapping the order of streets

Please enter an intersection name (enter "done" to stop): "Yonge Street & B

Yonge Street & Balliol Street

Yonge Street & Balmoral Avenue

Yonge Street & Baxter Street

Yonge Street & Bedford Park Avenue

Yonge Street & Belsize Drive

Yonge Street & Benson Avenue

Yonge Street & Berwick Avenue

Yonge Street & Birch Avenue

Yonge Street & Bishop Avenue

Yonge Street & Bloor Street East & Bloor Street West

Yonge Street & Blythwood Road

Yonge Street & Bogert Avenue

Yonge Street & Bowood Avenue

Yonge Street & Breadalbane Street & Maitland Street

Yonge Street & Brookdale Avenue

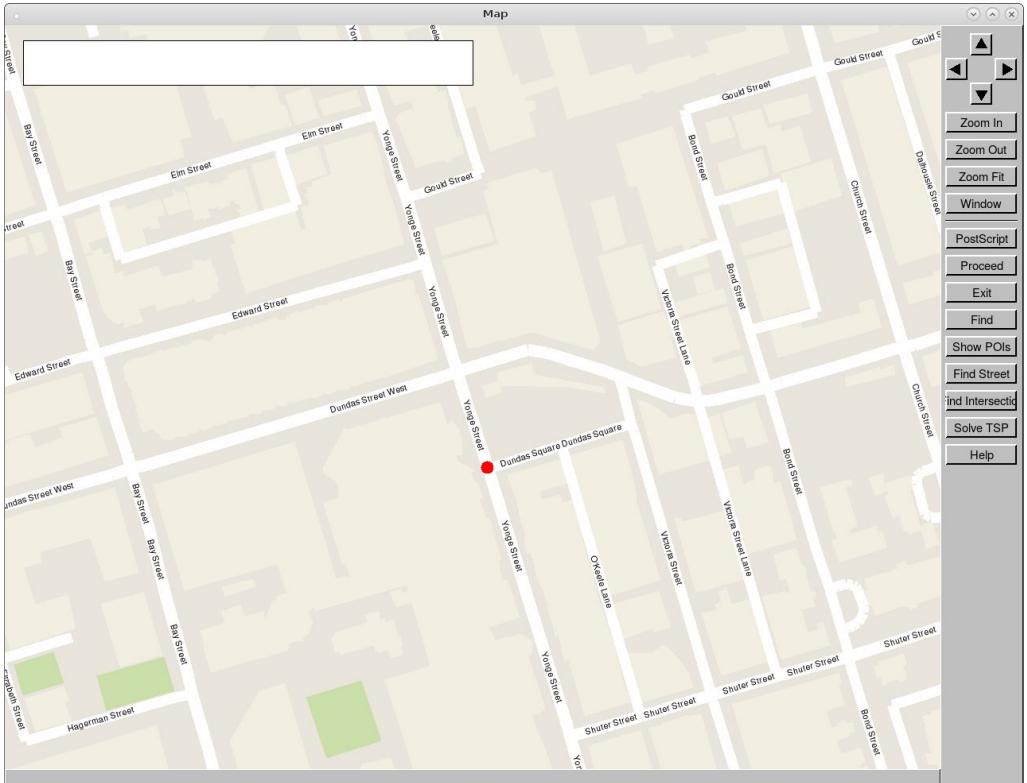
Yonge Street & Brookside Road & Silverwood Avenue

Yonge Street & Bunker Road

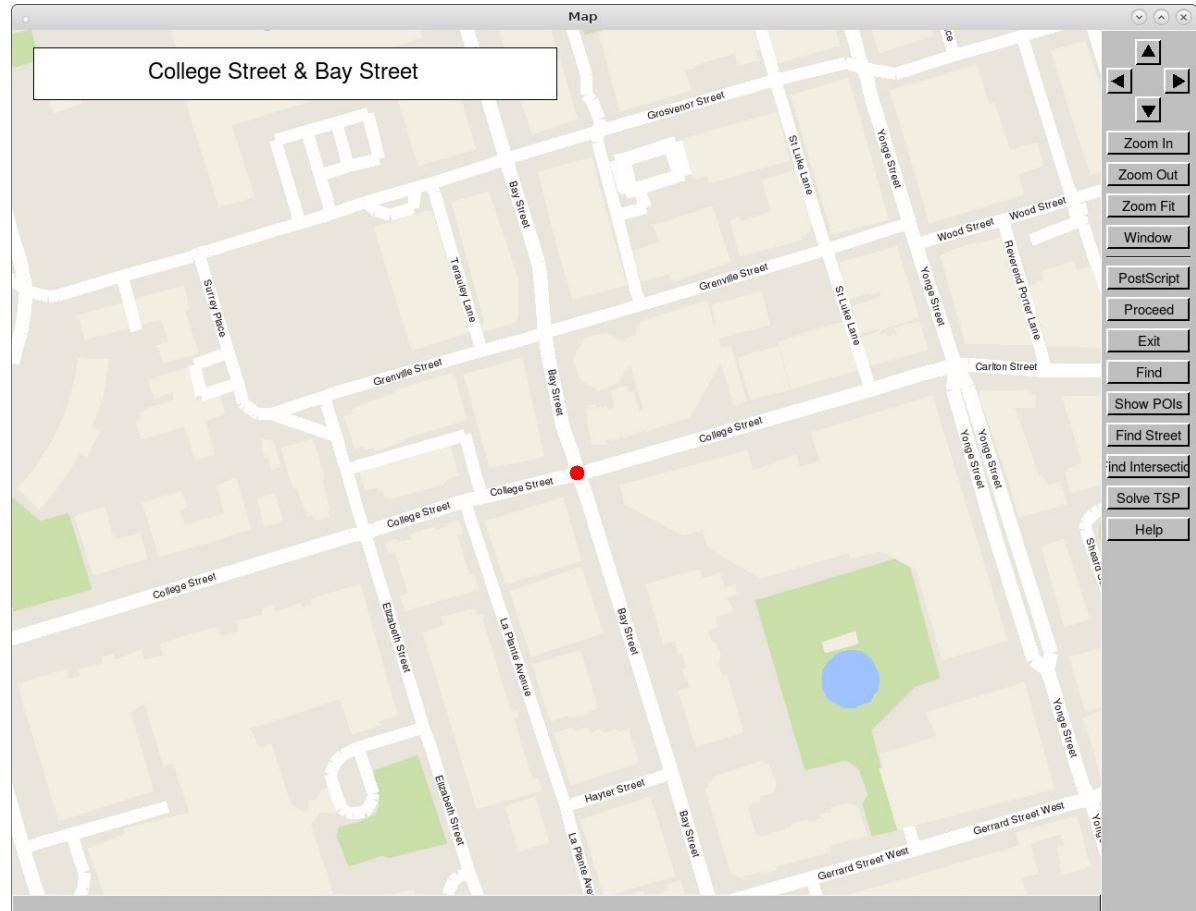
Yonge Street & Byng Avenue

Please enter an intersection name (enter "done" to stop): "Yonge Street & B"

## Partial name search



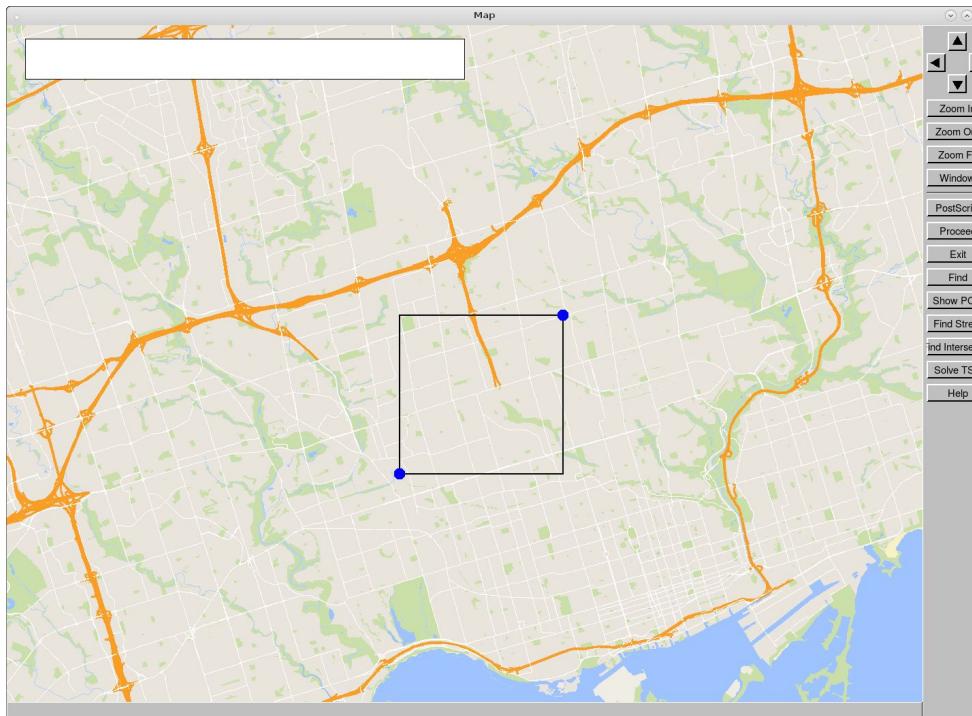
Search box for  
searching intersections



# Special Feature

- Region selection tool for dedicated Points of Interests search.
- Pathfinding.
- Courier Route Optimizer.

# Region Selection Tool



# Region Selection Tool

```
which type do you want? (enter done to exit query mode)
cafe
Name: Second Cup
Lat: 43.6772
Lon: -79.3529

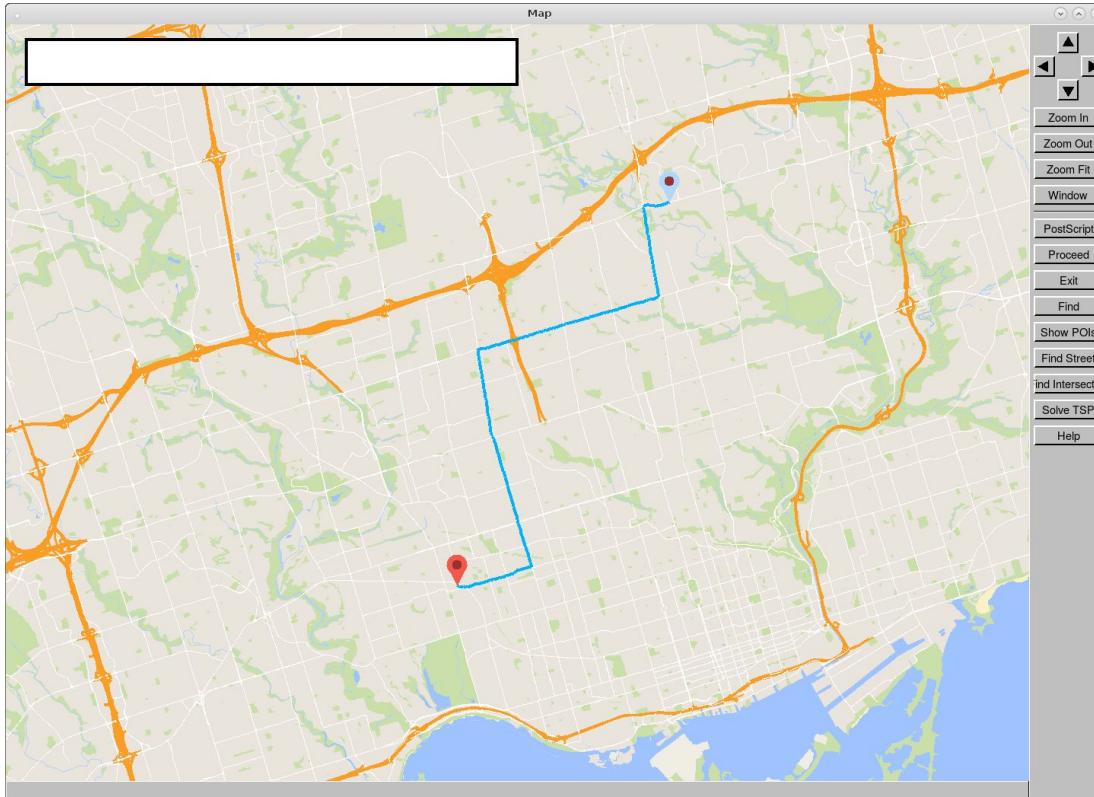
Name: Starbucks Coffee
Lat: 43.65
Lon: -79.3909

Name: Tim Hortons
Lat: 43.6524
Lon: -79.4062

Name: Tim Hortons
Lat: 43.6435
Lon: -79.3915

Name: Starbucks Coffee
Lat: 43.6453
Lon: -79.3894
```

# Pathfinding



# Pathfinding

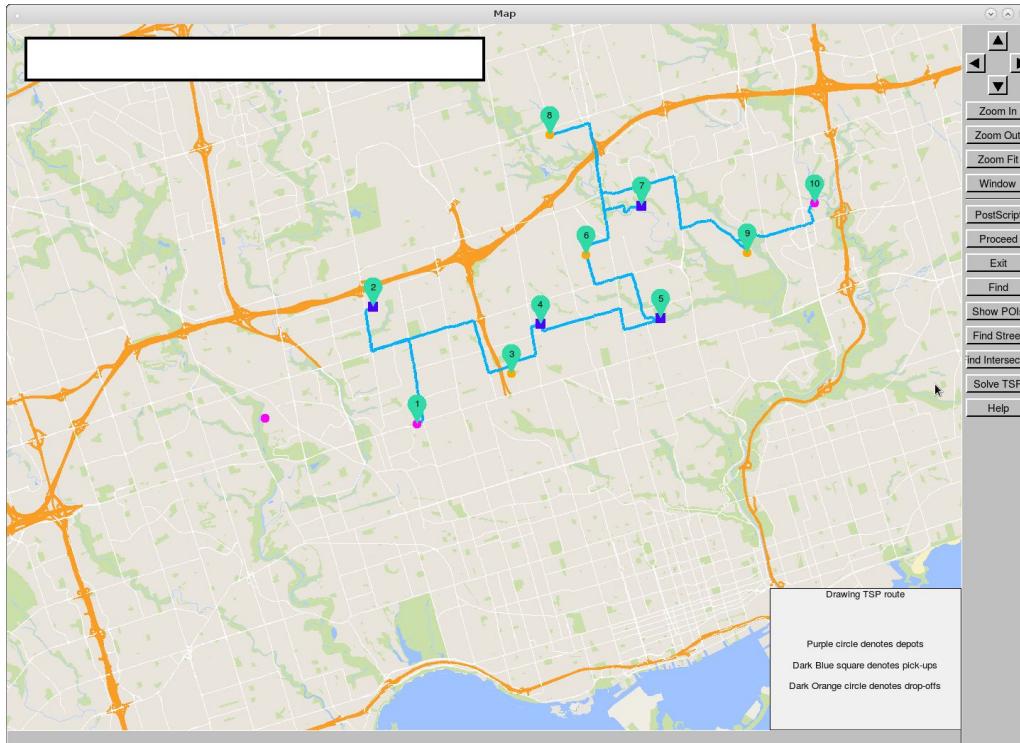
```
Map is running...
```

```
Here is the calculate path:  
Go along College Street for 1409.11 meters  
Go east  
Go along Carlton Street for 308.682 meters  
Go along Church Street for 751.316 meters  
Reach destination.
```

```
Total travel time: 2.96911 minutes.
```



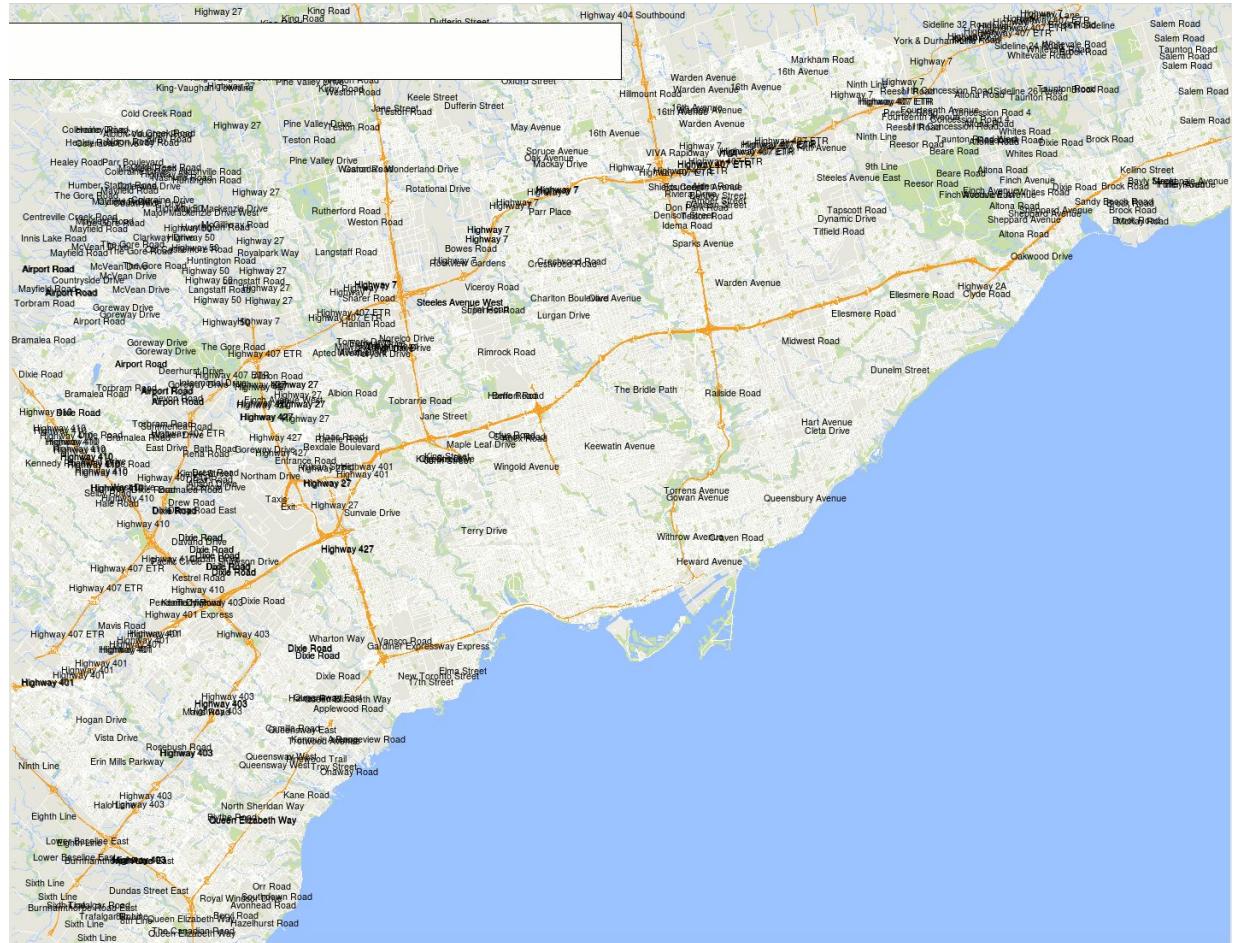
# Courier Route Optimizer



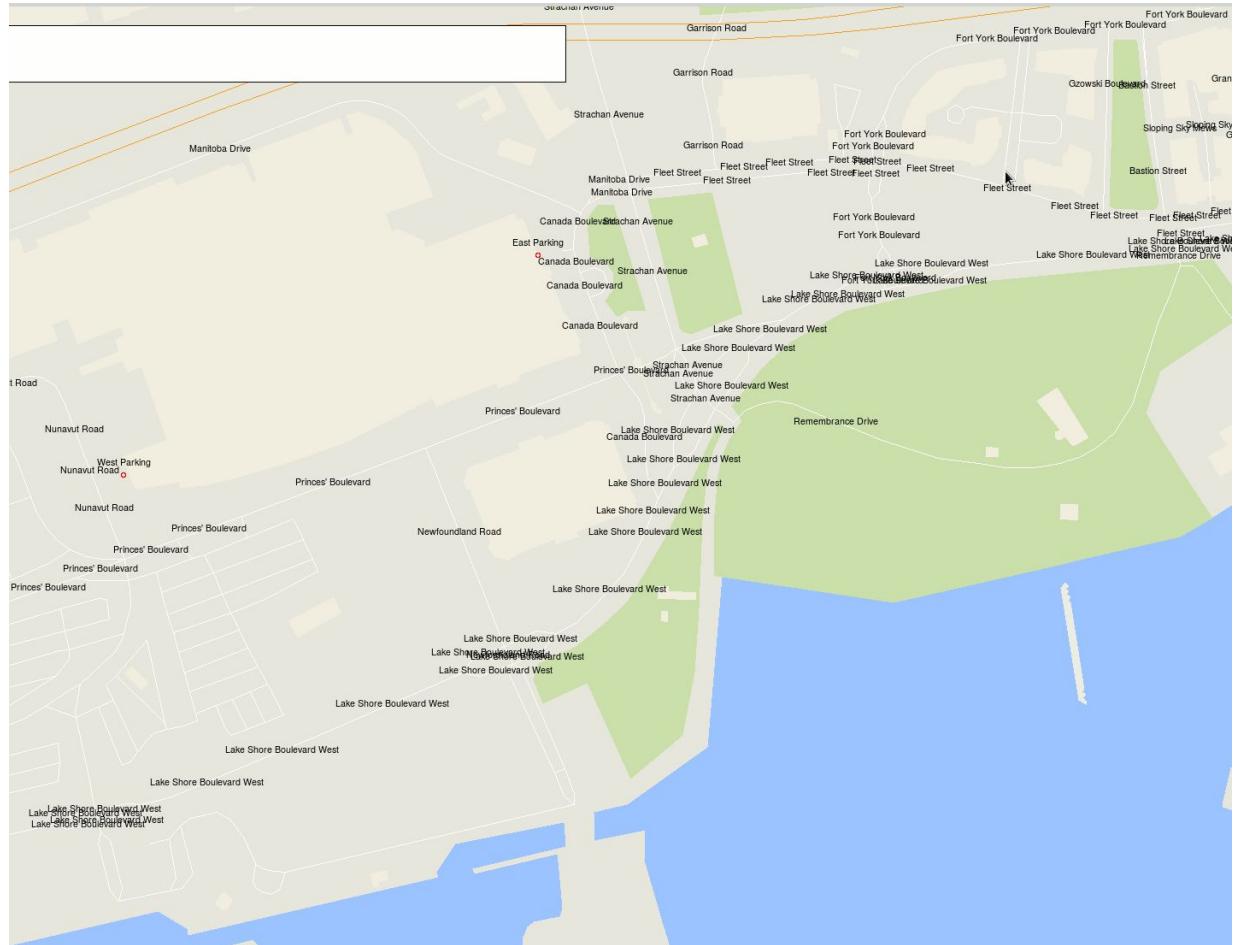
# Key Innovations

- UI Design
- Pathfinding Algorithm
- Courier Route Optimizer

# Nothing For You!



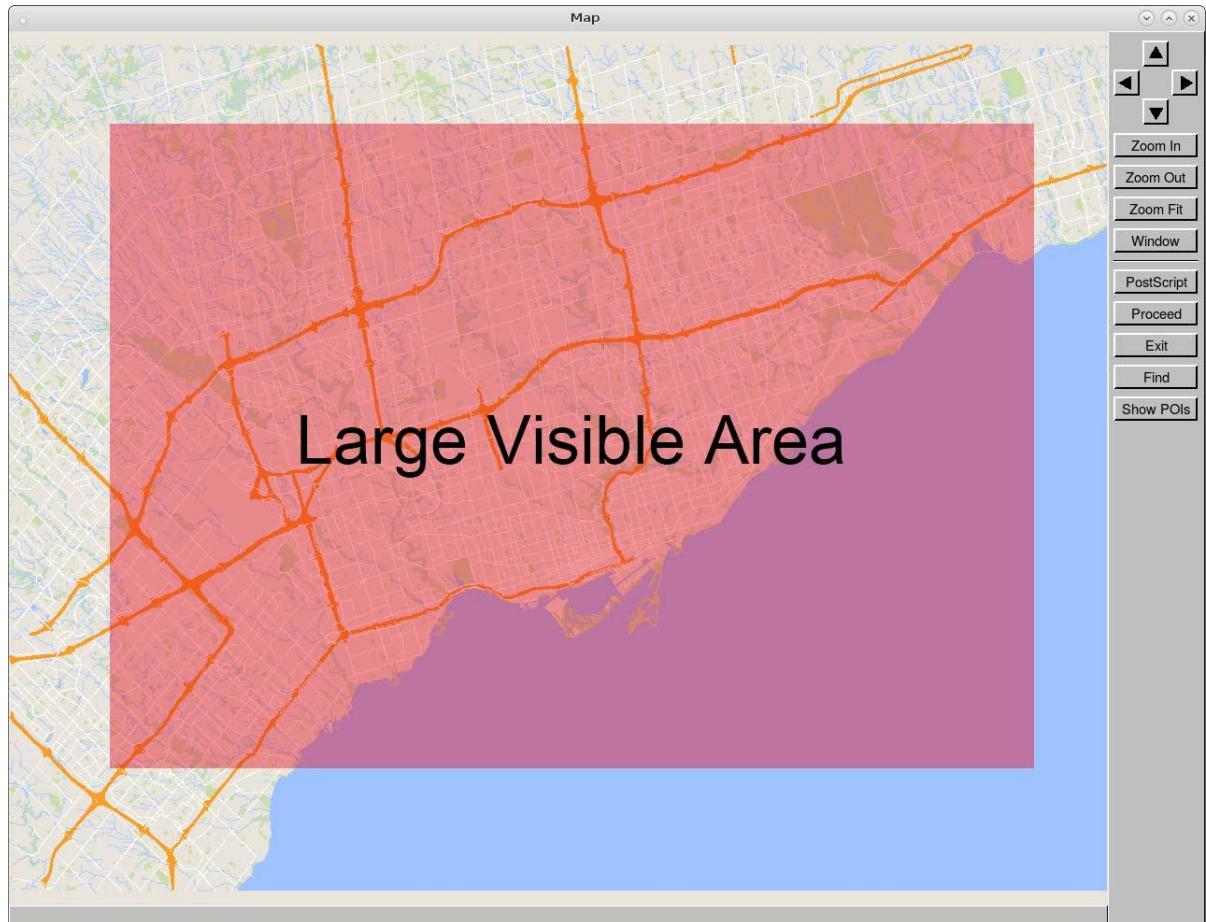
# Nothing For You!



# Zoom Level Control

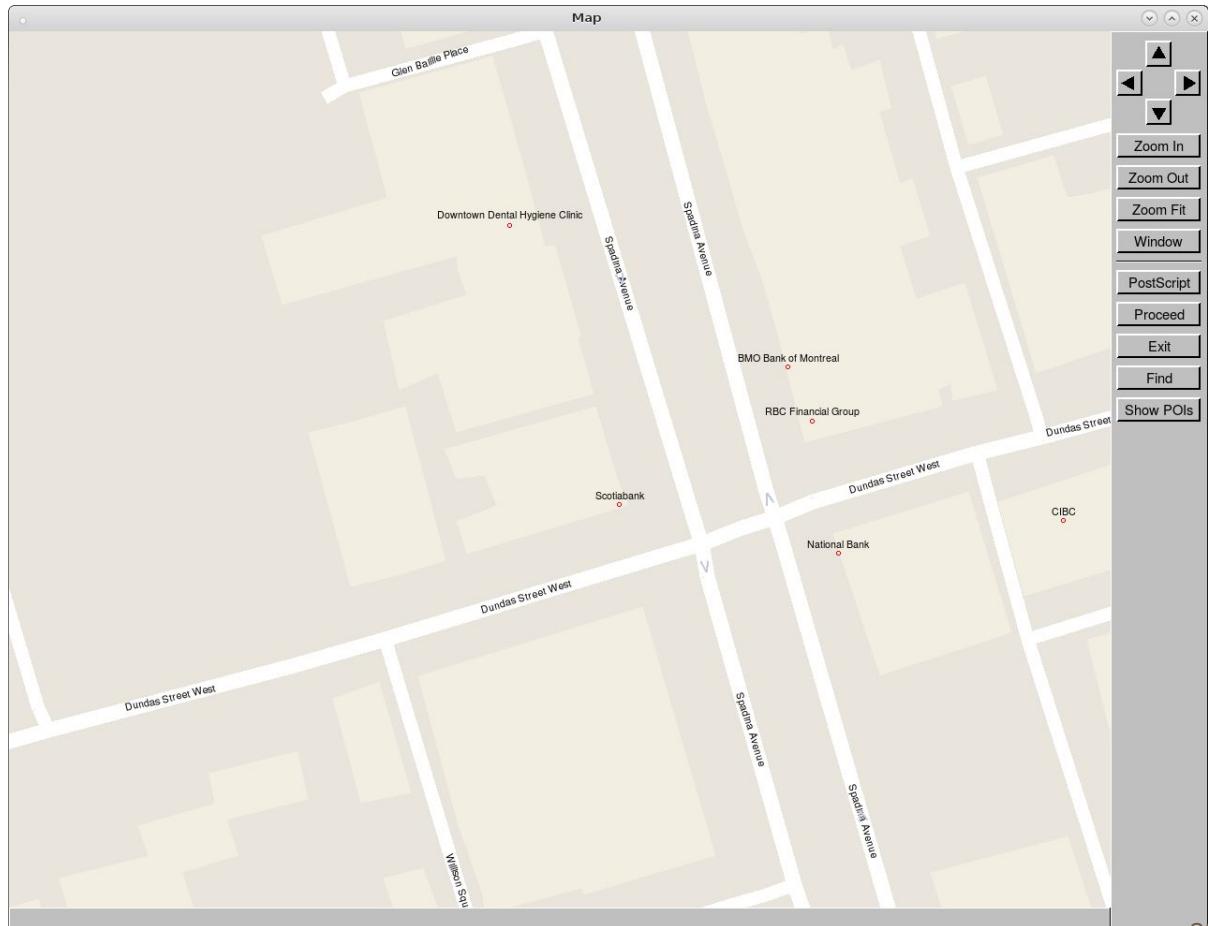
**Zoom Rate:**  
Map Area / Visible  
Area

**Low Zoom Rate Case**

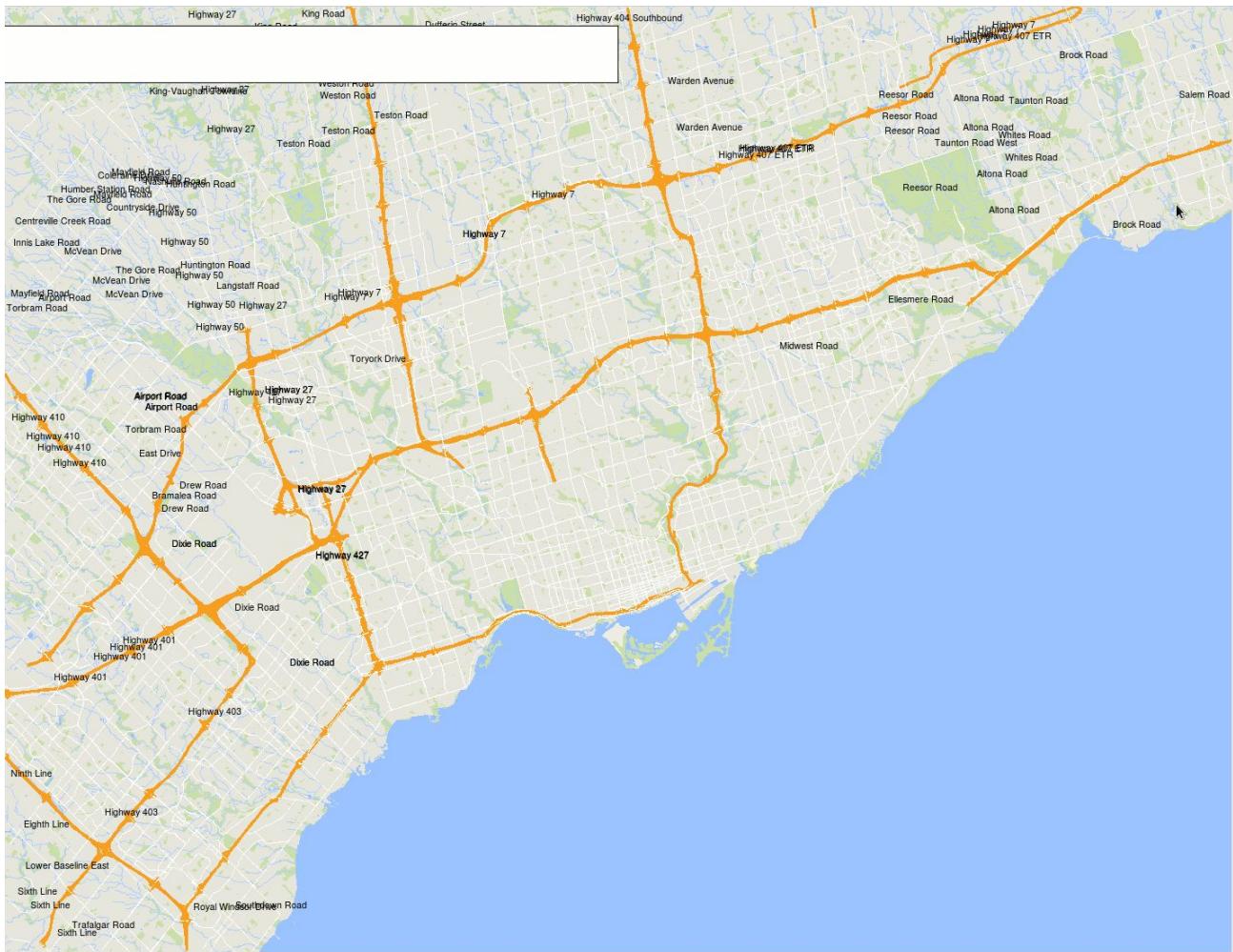


# Zoom Level Control

High Zoom Rate Case

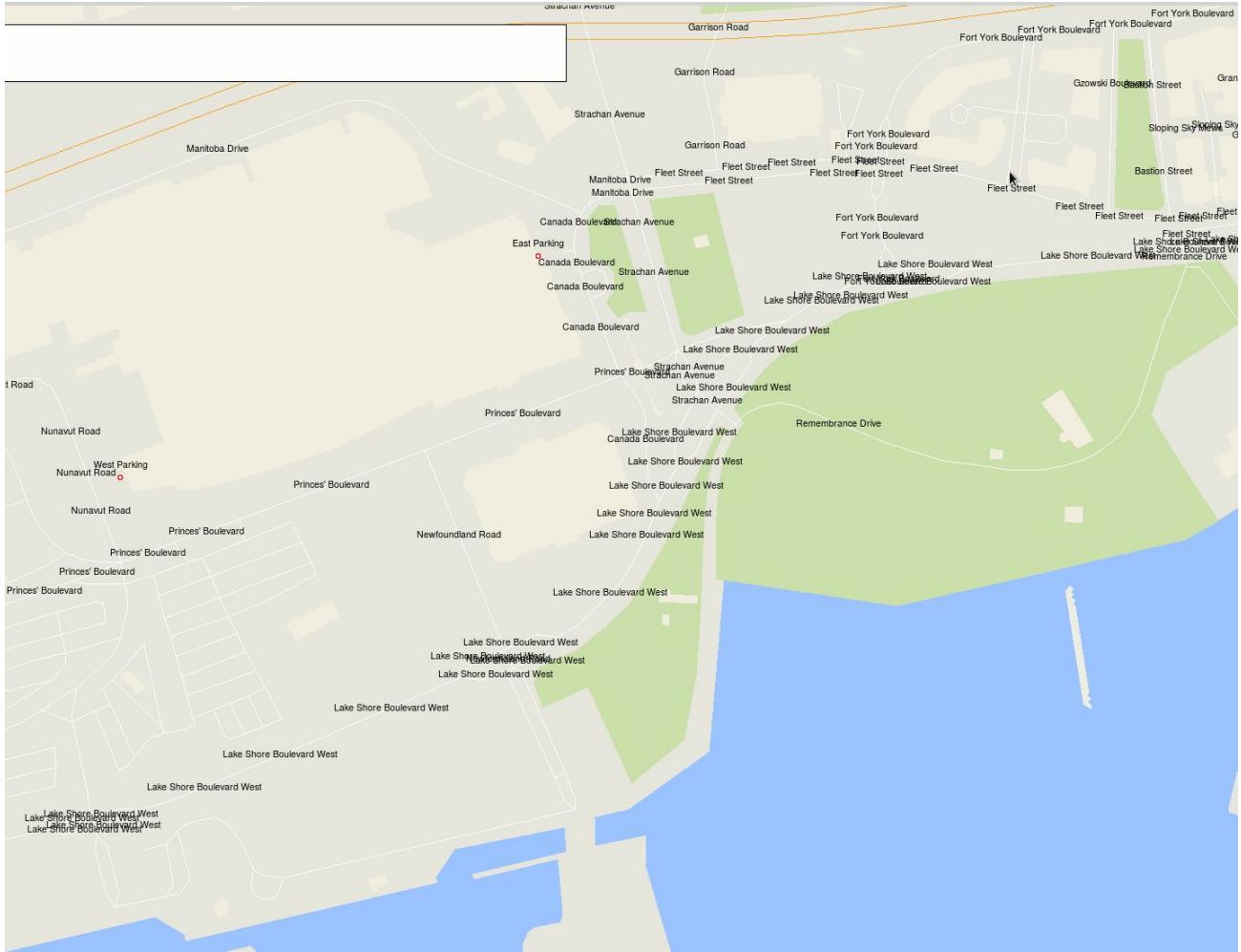


# Better!



# Better?

NO!



# Street Name Spacing

College Street



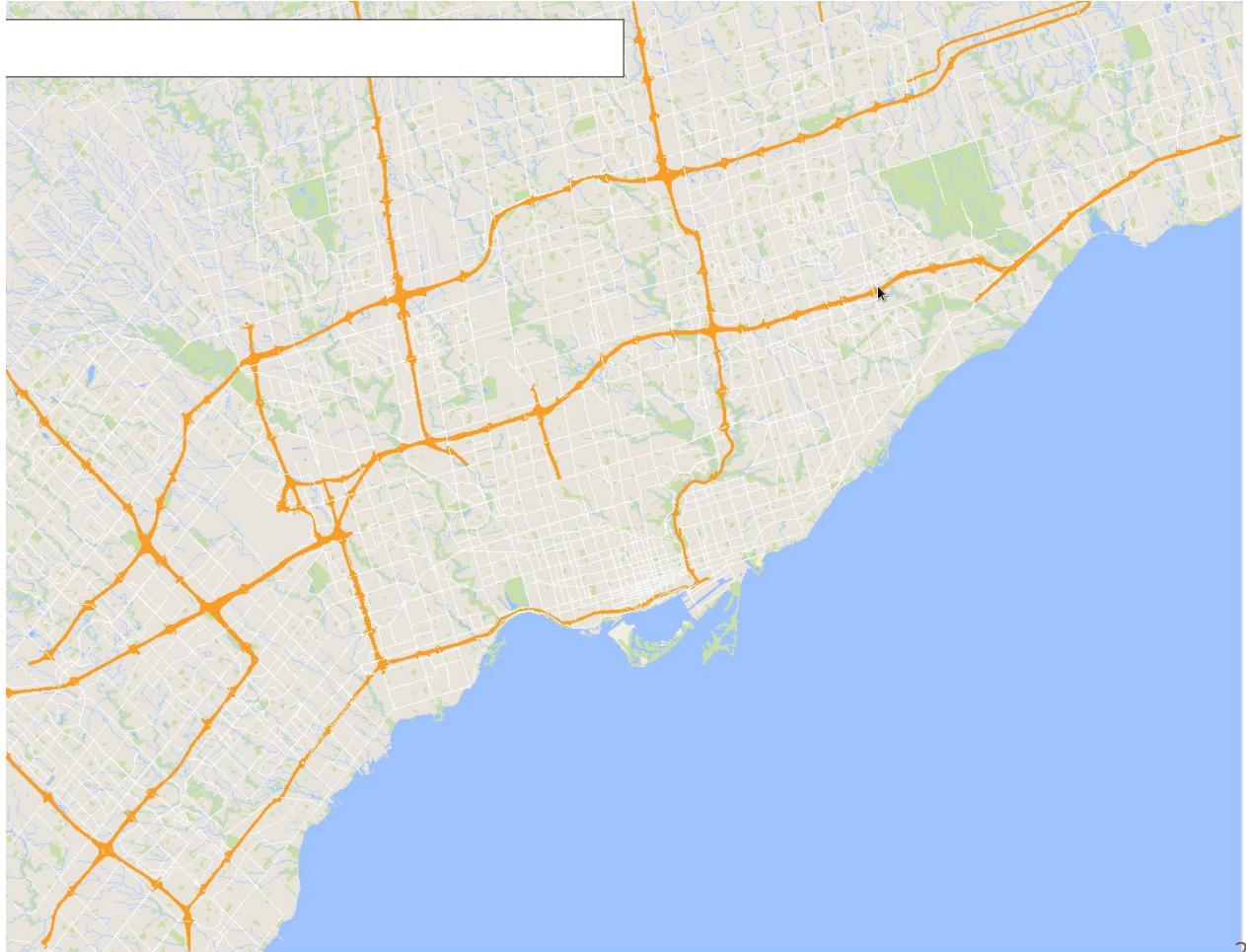
Zooming in



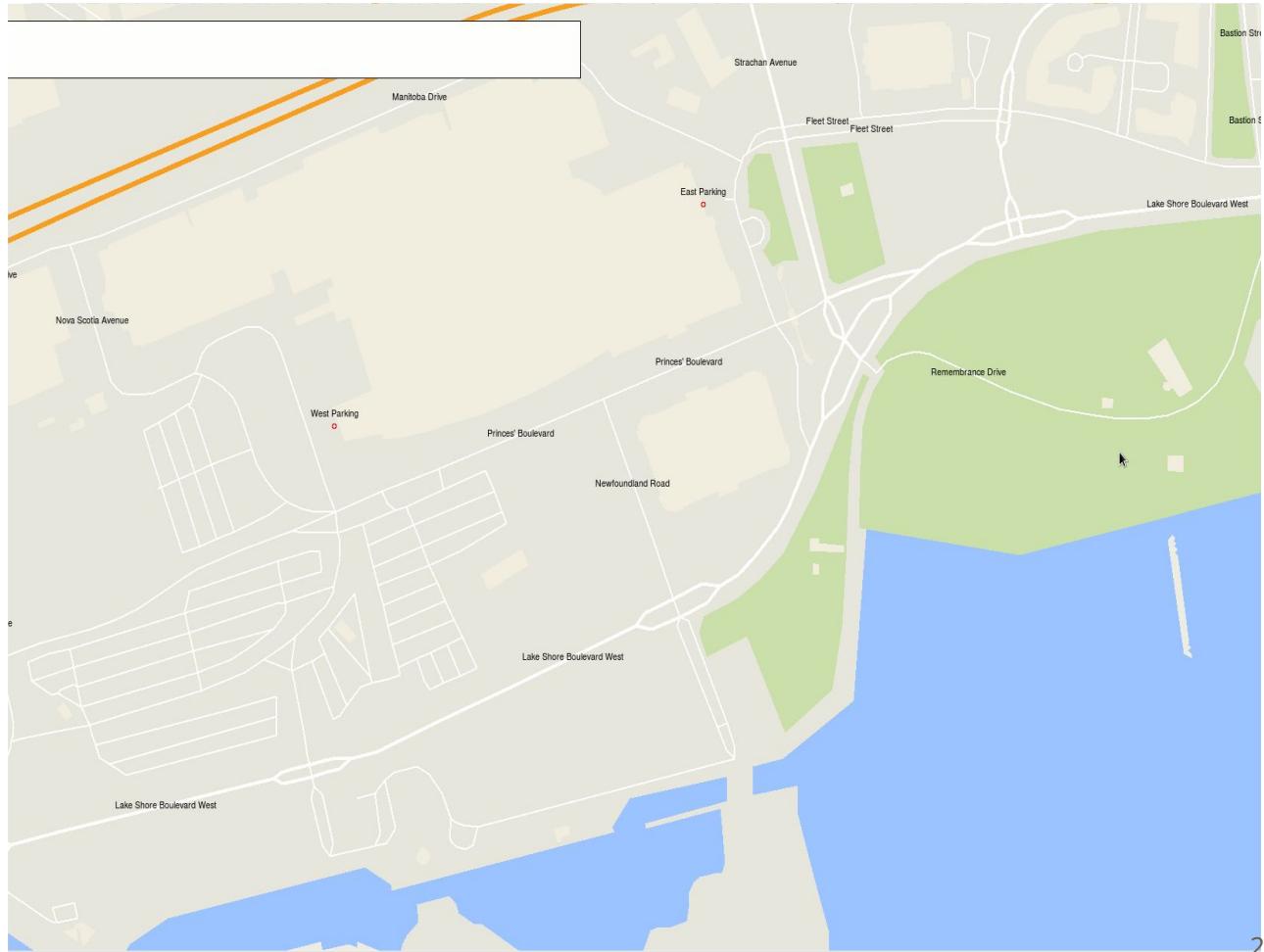
College Street



# Even Better!

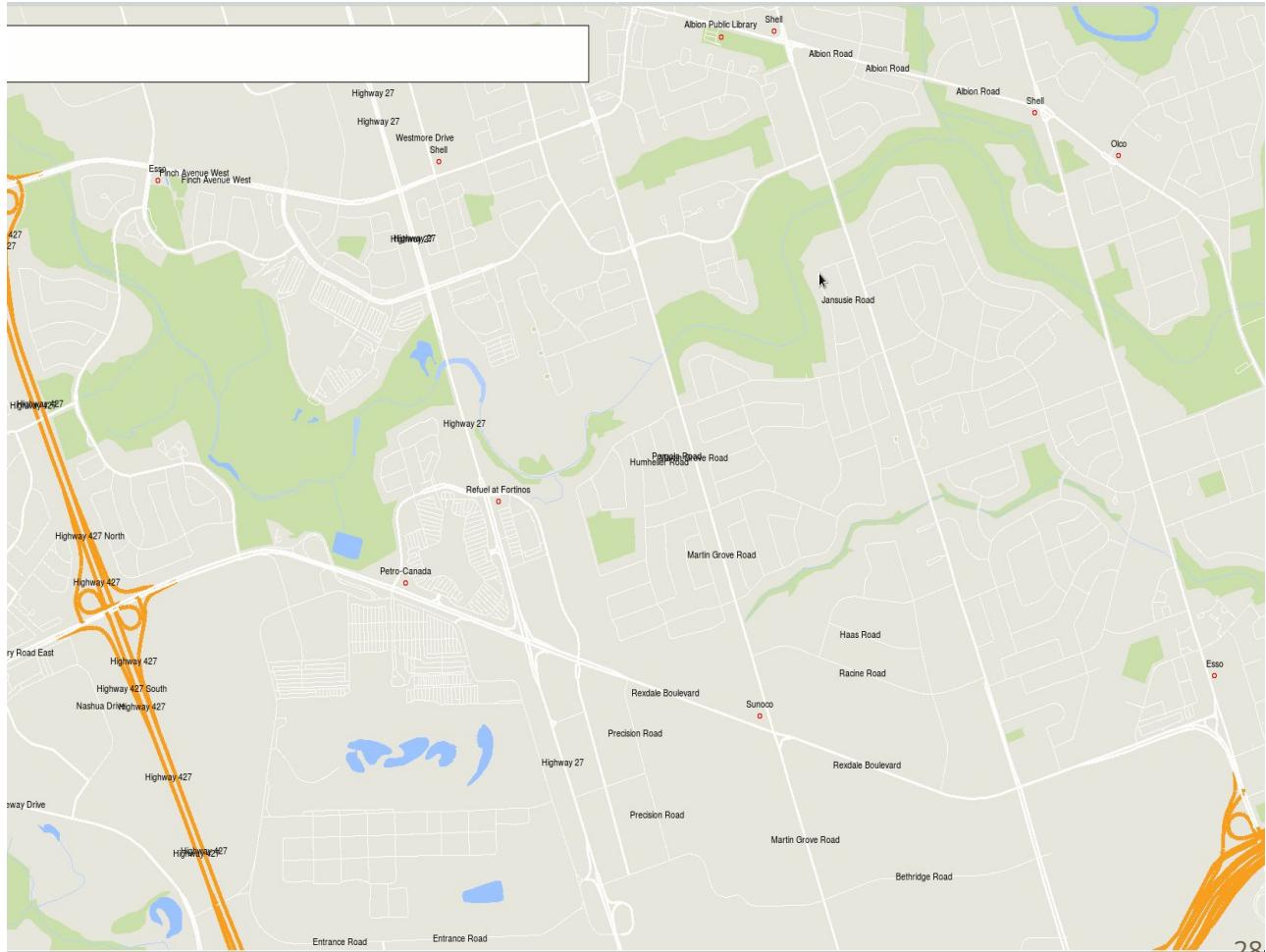


# Even Better!

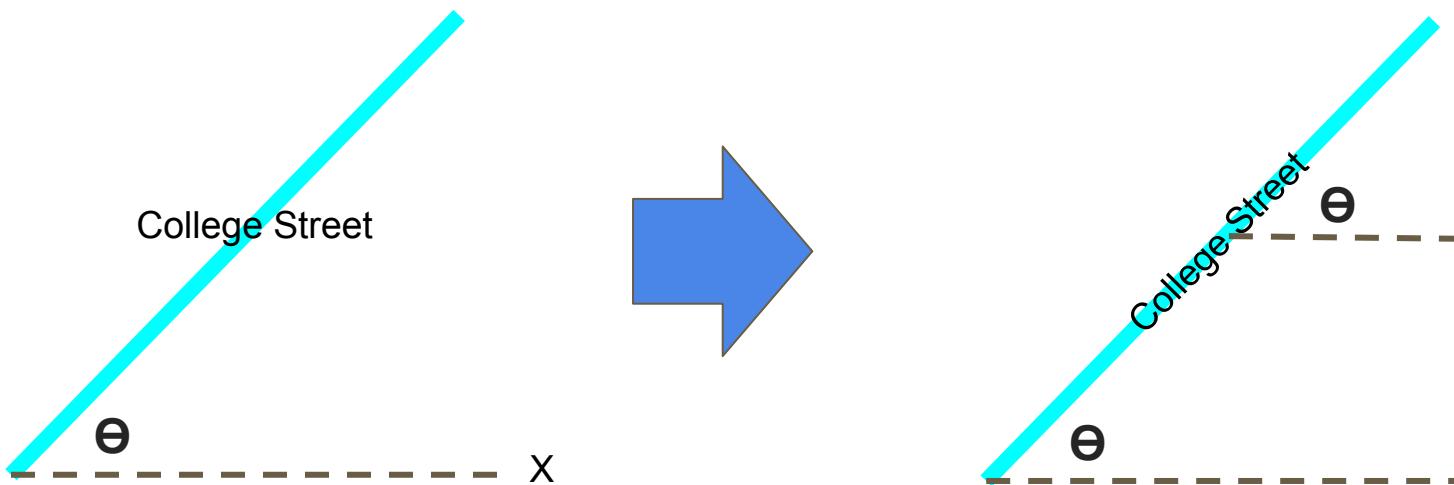


# Good Enough?

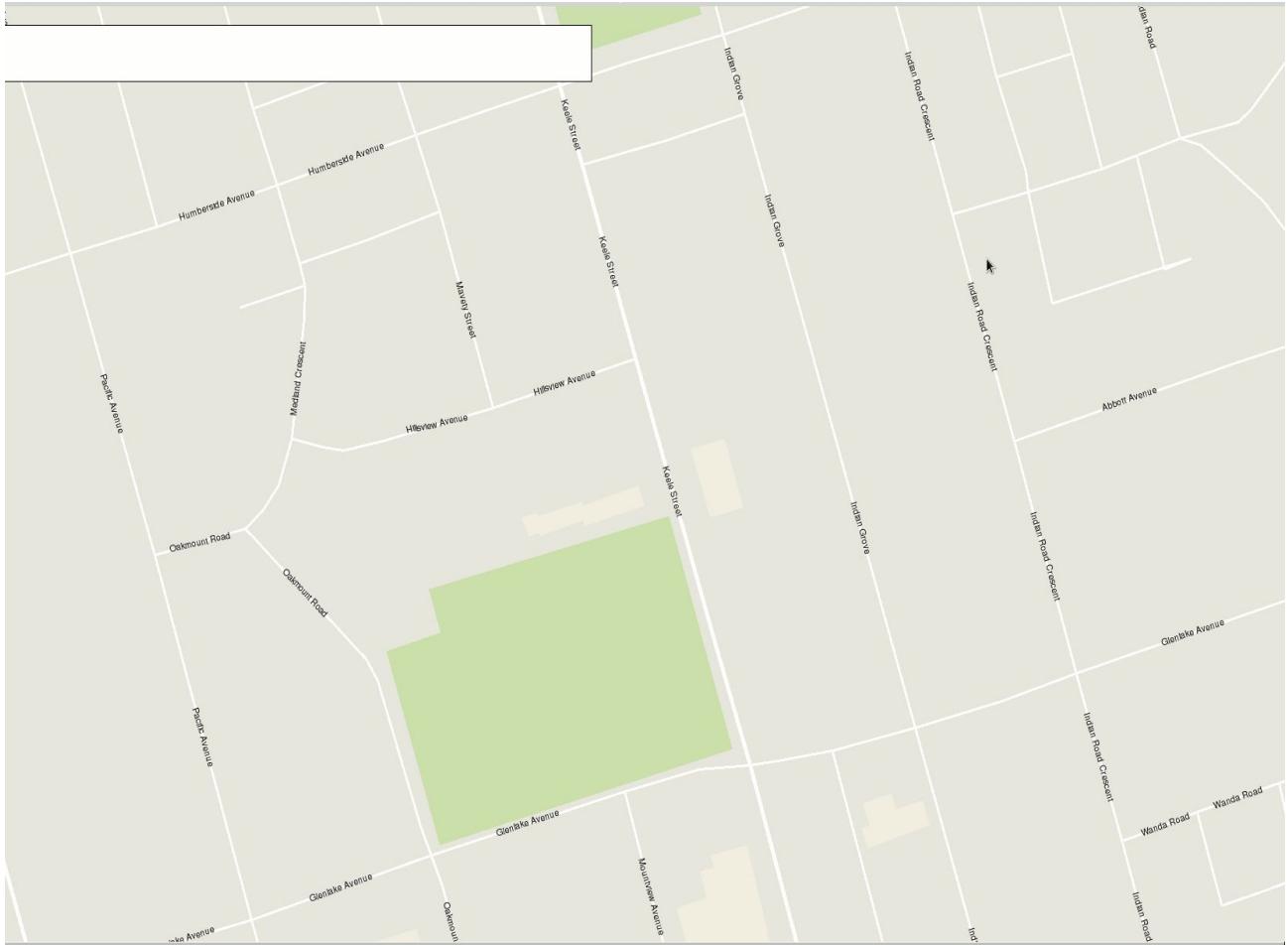
NO!



# Name Alignment

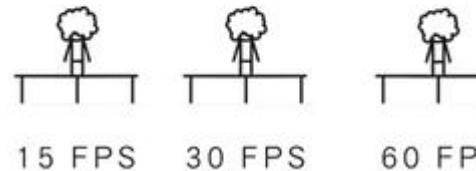


# Awesome!



# Drawing Performance

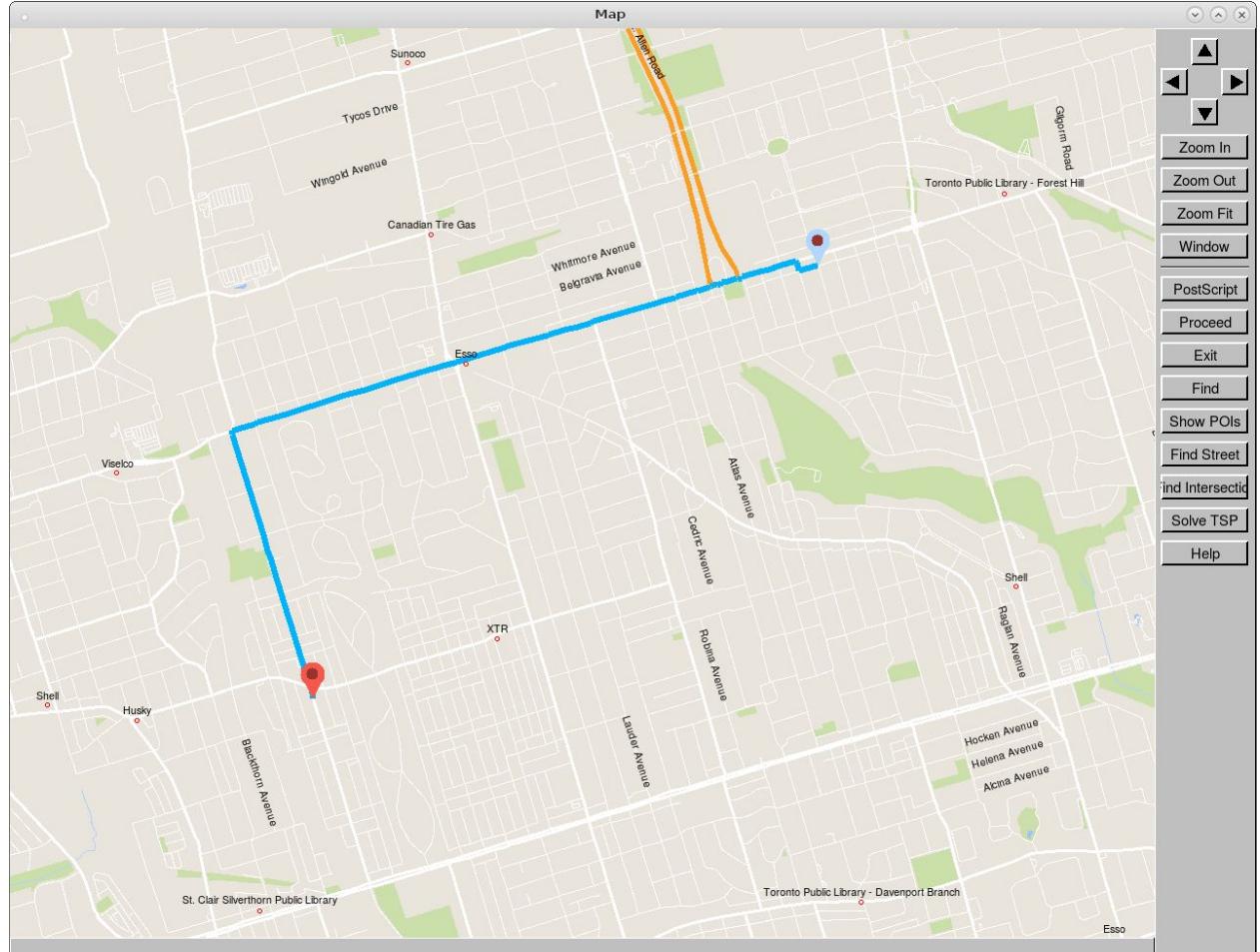
- 60 ms for redrawing
- Equivalent to 17 frames per second



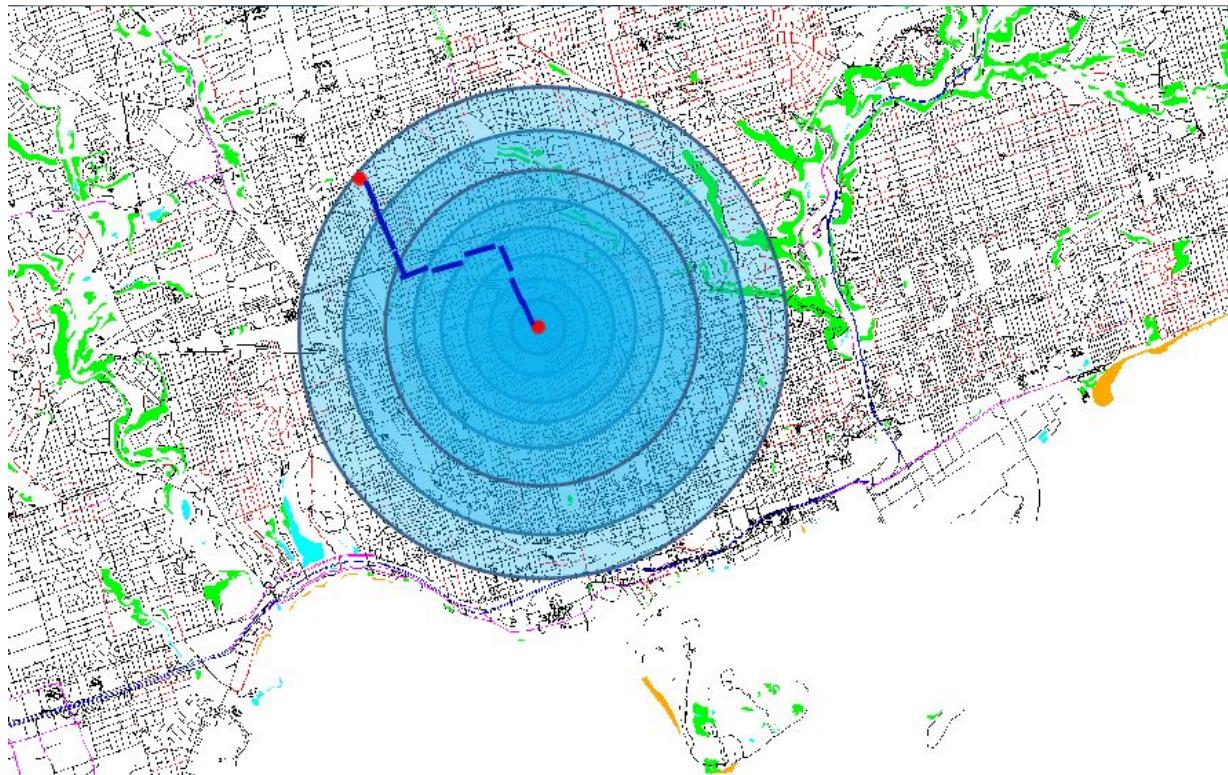
MakeAGIF.com

[1]"Testing", YouTube, 2016. [Online]. Available: [https://www.youtube.com/watch?v=rN\\_1q6Yvmql&feature=youtu.be](https://www.youtube.com/watch?v=rN_1q6Yvmql&feature=youtu.be).

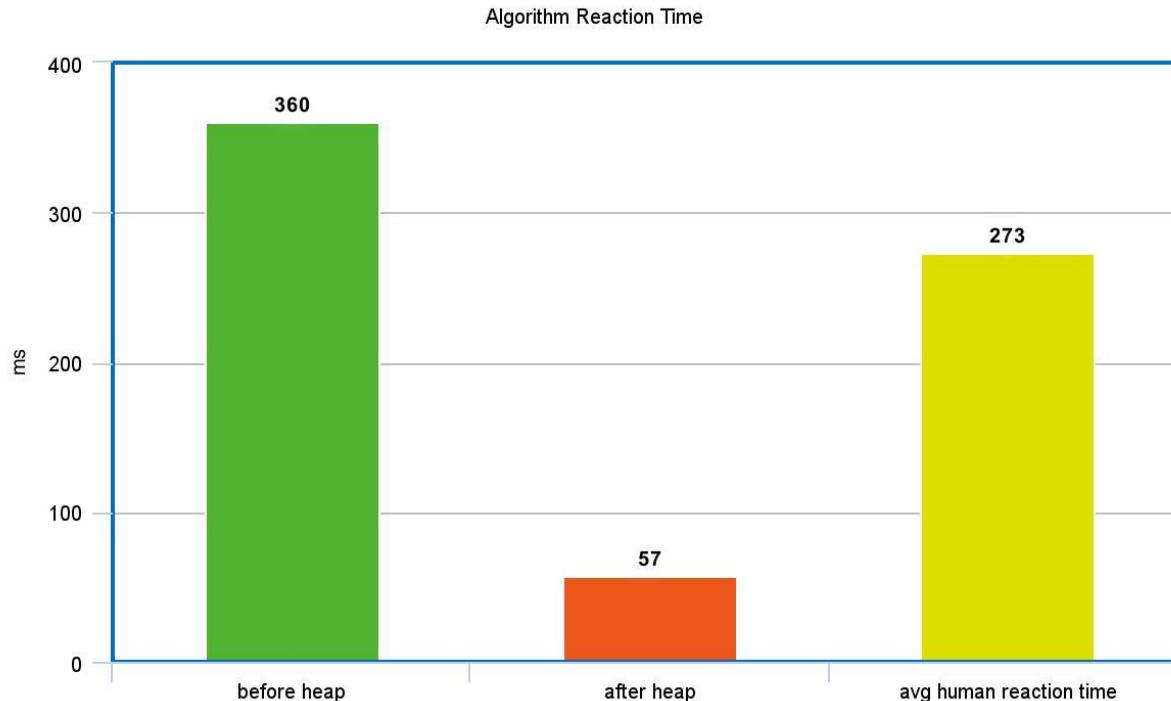
# Pathfinding



# Dijkstra's Algorithm For Finding Closest POI



# Heap For Performance Boost



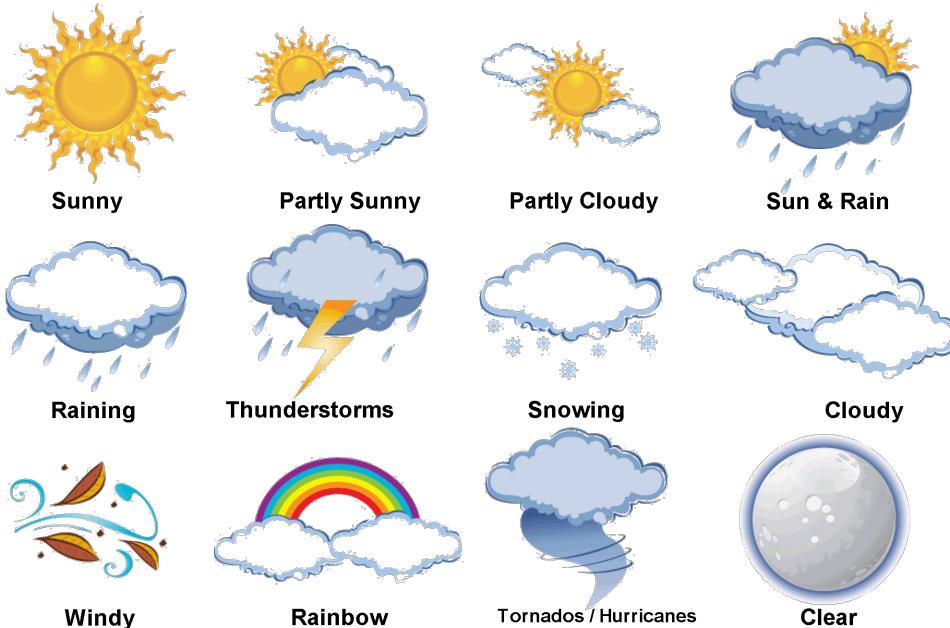
[1]"Human Benchmark - Reaction Time Statistics", Humanbenchmark.com, 2016. [Online]. Available:  
<http://www.humanbenchmark.com/tests/reactiontime/statistics>. [Accessed: 10- Apr- 2016].

# Courier Route Optimizer - Edge Cost Calculation



# For the future...

Take the weather into account



# User Identification

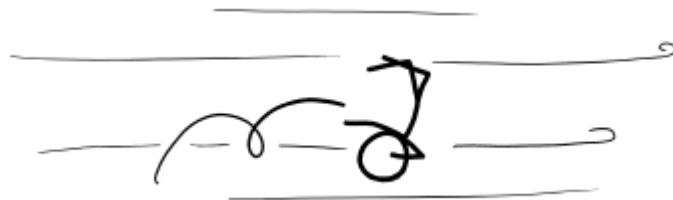
Favored User Classes:

- Long-term residents
- Tourists
- New-comers

-----Individuals instead of organizations

# Warning...

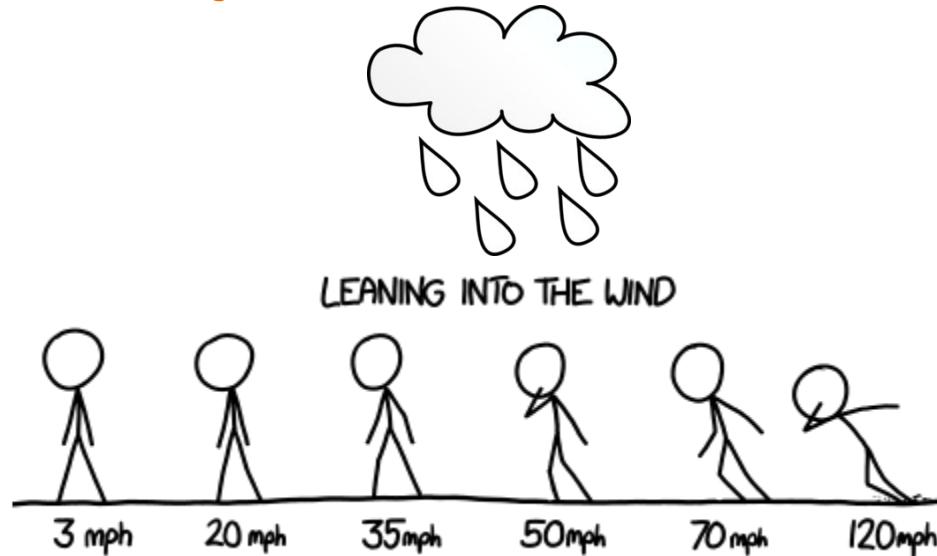
“Don’t go there. The wind is gonna blow you away.”



“Building Interference Effect”

[1] "500 MPH". *What-if.xkcd.com*. N.p., 2016. Web. 10 Apr. 2016.

# Which one would you like...



[1] "500 MPH". *What-if.xkcd.com*. N.p., 2016. Web. 10 Apr. 2016.

[2] "Raining Cloud Outline Clip Art At Clker.Com - Vector Clip Art Online, Royalty Free & Public Domain". *Clker.com*. N.p., 2016. Web. 10 Apr. 2016.

# The Undesirable Wind, the Undesirable Rain

“I'd like to go along a path that can help me escape the wind and rain.”

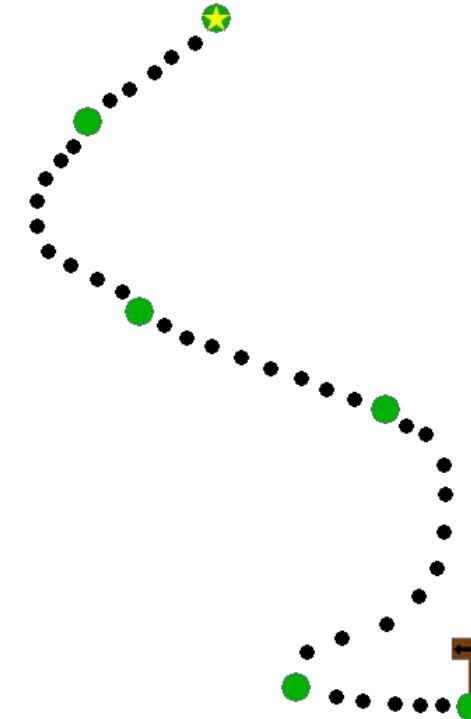


© Brendan Beirne / MEDIA-MODE.COM

[1] "Sidney Attacked by Storm". Qxkp.net. N.p., 2016. Web. 10 Apr. 2016.

**We can change the way of pathfinding.**

# Windless. Rainless. Awesome.



[1] "A Stickman Communes With Nature". *Dtc-wsuv.org*. N.p., 2016. Web. 10 Apr. 2016.

# Objective Condition

The precision of real-time weather forecasting

Toronto, ON M5S  
Sunday 1:00 PM  
Cloudy



Toronto, ON M5S  
Sunday 1:00 PM  
Cloudy



[1] "Weather - Google Search". *Google.ca*. N.p., 2016. Web. 10 Apr. 2016.

# We are going to...

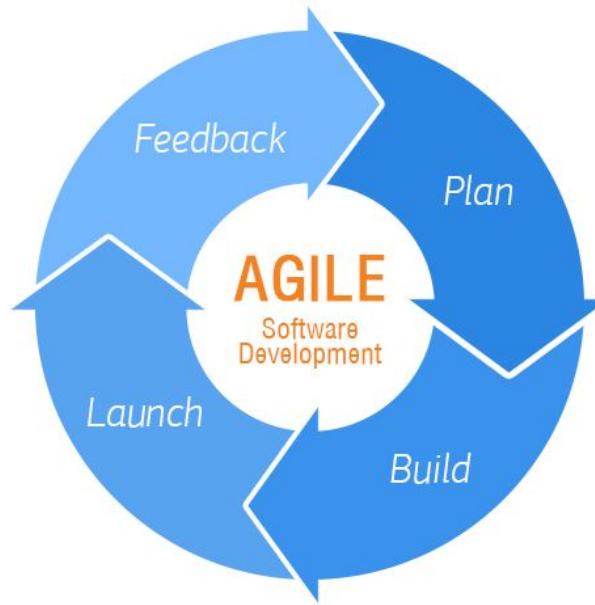
- Port to Android/iOS
- Access needed information
- Develop the proposed function



[1] "Waving Android Cookie Cutter By Keithimyers". *Thingiverse.com*. N.p., 2016. Web. 10 Apr. 2016.

# Development Process

Agile software development



[1] "Why Should You Use Agile Software Development Methodology? | A2 Design Inc. Blog".*A2design.biz*. N.p., 2016.  
Web. 10 Apr. 2016.

# Frequent Customer Engagement

- Minimize Expectation Gap

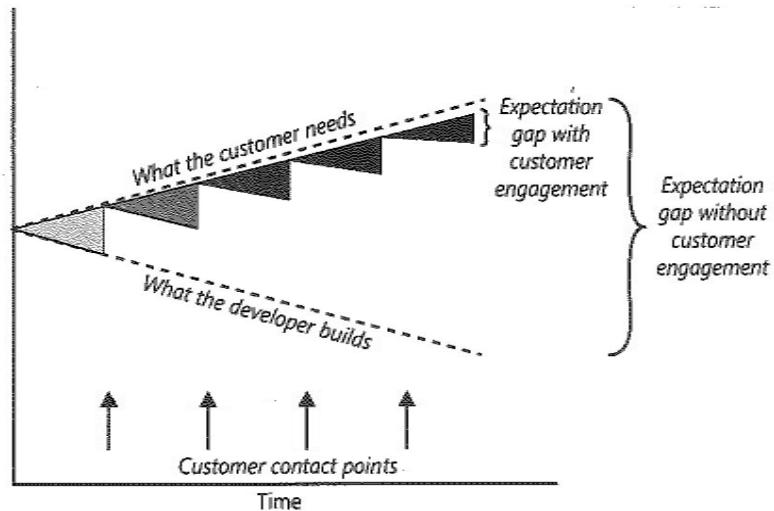


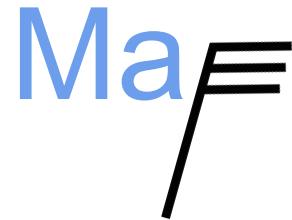
FIGURE 2-1 Frequent customer engagement reduces the expectation gap.

# Summary

## Map Software

User-friendliness

Enhanced Functionalities



## Future

Incorporate with real-time weather data for smarter pathfinding

[1]

[https://upload.wikimedia.org/wikipedia/commons/thumb/9/9c/Symbol\\_wind\\_speed\\_06.svg/2000px-Symbol\\_wind\\_speed\\_06.svg.png](https://upload.wikimedia.org/wikipedia/commons/thumb/9/9c/Symbol_wind_speed_06.svg/2000px-Symbol_wind_speed_06.svg.png)